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nous treatise, but he will probably discover, when it is too late, that his candidate has but one imposing garment to conceal his unfitness for the work required, or, worse still, may find that he does not want to teach at all, but to investigate.

It may take several years for such a misfit teacher to adjust himself to his proper environment, and to discover that it is worth more to be a good neighbor and a useful man in the community than it is to be known in Germany.

In conclusion, therefore, it seems to me that by the over-emphasis of research the university is in danger of sacrificing the sound, symmetrical education of the individual for the sake of a too rapid growth of science. The university student should be trained in the methods of investigation, because it may give him fertility and power, not because it is his business or duty to contribute something new to the world's store of knowledge.

As the value of his contribution may or may not afford a measure of his originality or of his ability to teach, the university should not insist too rigidly on an original contribution as a requirement for the doctor's degree, and should eliminate every possible element of chance that may deprive the candidate of his well-earned license to teach, or that may unnecessarily prolong his term of apprenticeship.

The examination for the doctor's degree should precede rather than follow the approval of a thesis, in order to check too early specialization and an undue haste in the publication of fragmentary research work.

The biological material already available for teaching should be condensed and put into logical order for purposes of more direct instruction, and the educational requirements of the medical man, the teacher, and the professional investigator should, so far as necessary, be met separately.

The physiological and experimental sides of biology should receive greater attention, and that kind of out-door work on living animals in their natural surroundings, for which the marine and lake laboratories offer such excellent opportunities, should be specially developed, because among other reasons, of its bearing on the nature work in the public schools. The work done in these laboratories should be formally recognized as part of the requirements for the higher degrees, and the laboratories themselves grafted on to the university and college so as to form as much a part of their equipment as do the library and museum. Results of the greatest importance for biology, in all its relations to education, will surely follow coöperation in this direction.

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AMERICAN MATHEMATICAL SOCIETY.

THE sixth annual meeting of the American Mathematical Society was held at Columbia University on Thursday, December 28, 1899. On the same and the following day the Chicago Section met at the University of Chicago. Occurring in the holidays, these two meetings are more easily attended than those of other seasons, and afford better opportunities for personal conference and discussion. The annual meeting offers the additional interest of the election of officers, the presentation of annual reports which regularly bear testimony to the remarkable prosperity of the Society, and the general marking of the close of one year of progress and the opening of another. An especially attractive feature of this year's annual meeting was the scholarly Presidential Address of President R. S. Woodward on 'The Century's Progress in Applied Mathematics.' This address, which appears in the present number of *SCIENCE*, as well as in the next number of the *Bulletin* of the Society, was delivered before

an appreciative audience of nearly eighty persons, the members of the American Physical Society attending, by invitation, in a body. During the reading of the address and of Professor Pupin's paper, the chair was occupied by President H. A. Rowland, of the Physical Society. As predicted in the report of the October meeting, the relations of these two societies are becoming more and more intimate and cordial, a tendency which cannot be too highly commended. The results are mutually beneficial. The attendance of members of the Mathematical Society increased more than seventy per cent. over last year, this Society furnishing nearly one-half of the total attendance at the meeting of both bodies.

At the annual election the following officers and members of the Council were chosen: President, R. S. Woodward; First Vice-President, E. H. Moore; Second Vice-President, T. S. Fiske; Secretary, F. N. Cole; Treasurer, W. S. Dennett; Librarian, Pomeroy Laden; Committee of Publication, F. N. Cole, Alexander Ziwet, F. Morley; Members of the Council to serve for three years, Simon Newcomb, Oscar Bolza, L. A. Wait. Suitable resolutions were adopted on the retirement of Professor Jacoby from the office of Treasurer after a service dating from the founding of the Society.

The Council announced the election of the following persons to membership in the Society: Professor William Beebe, Yale University; Dr. J. V. Collins, State Normal School, Stevens Point, Wis.; Professor A. R. Forsyth, Trinity College, Cambridge, England; Professor M. W. Haskell, University of California; Mr. C. A. Noble, University of California; Miss E. N. Martin, Ph.D., Ardmore, Pa.; Mr. E. B. Wilson, Yale University; Miss R. G. Wood, New Haven, Conn. Four applications for membership were reported. The total membership of the Society is now 342, a gain of 27 during the year. About 110 papers were

presented before the Society during the year as against 83 in 1898.

The first number of the *Transactions* is now in press and will appear in January. Later numbers will appear at intervals of three months.

The following papers were presented at the Annual Meeting:

- (1) DR. G. A. MILLER: 'On the groups which have the same groups of isomorphisms.'
- (2) PROFESSOR MAXIME BÔCHER: 'On regular singular points of linear differential equations of the second order whose coefficients are not necessarily analytic.'
- (3) DR. VIRGIL SNYDER: 'On cyclical quartic surfaces in space of n dimensions.'
- (4) DR. VIRGIL SNYDER: 'On the geometry of the circle.'
- (5) MR. W. B. FITE: 'A proof that the commutator subgroup of a group may contain operators which are not commutators.'
- (6) J. E. CAMPBELL, M.A.: 'On the types of linear partial differential equations of the second order (in three independent variables) which are unaltered by the transformations of a continuous group.'
- (7) PROFESSOR L. E. DICKSON: 'Proof of the existence of the Galois field of order p^r for every integer r and prime number p .'
- (8) DR. E. M. BLAKE: 'On plane movements whose point loci are of order not greater than four.'
- (9) PROFESSOR R. S. WOODWARD: Presidential Address: 'The century's progress in applied mathematics.'
- (10) PROFESSOR M. I. PUPIN: 'The propagation of electrical waves over non-uniform conductors.'
- (11) PROFESSOR HENRY TABER: 'The singular transformation of a group generated by infinitesimal transformations.'
- (12) DR. J. I. HUTCHINSON: 'On certain relations among the theta constants.'
- (13) PROFESSOR E. O. LOVETT: 'Singular solutions of Monge equations.'

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SCIENTIFIC BOOKS.

Everyday Butterflies. A Group of Biographies. By SAMUEL HUBBARD SCUDDER. Boston and New York, Houghton, Mifflin & Company. 1899. 12mo. Pp. viii + 386. 9 plates, 23 figures; 48 figures in text. Price, \$2.00.